UPPER TRISHULI-1 HEP (216MW)

Client	**Nepal Water and Energy Development Company Private Limited**
Owner's Engineer	**Tractebel Engineering GmbH / Jade Consult**

REVIEW NOTE

Contractor	**Doosan Heavy Industries & Construction Co., Ltd.**		
Title of the Document	Excavation and Initial Support Drawings of Investigation Tunnel for Powerhouse		
Document No.	UT1-C-385-CVL-DG-65002-01 UT1-C-385-CVL-DG-65002-02 UT1-C-385-CVL-DG-65002-03 UT1-C-385-CVL-DG-65002-04	Revision	D
Date of Documents	31.01.2022	Received Date	03.02.2022
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Review Note No.	**RN-0053**	**Present Review Date**	**04.02.2022**
		Present Review Status	**AN**

A: Approved AN: Approved as Noted RR: Returned for Resubmission FI: For Information, only

General Comments

Most of previous comments of the reviewer were considered and were indicated in the drawings. Only some technical comments remained. There are several other comments, which refer to formalities, only.

The drawings are marked and commented.

Drawing UT1-C-385-CVL-DG-65002-01, Rev. D

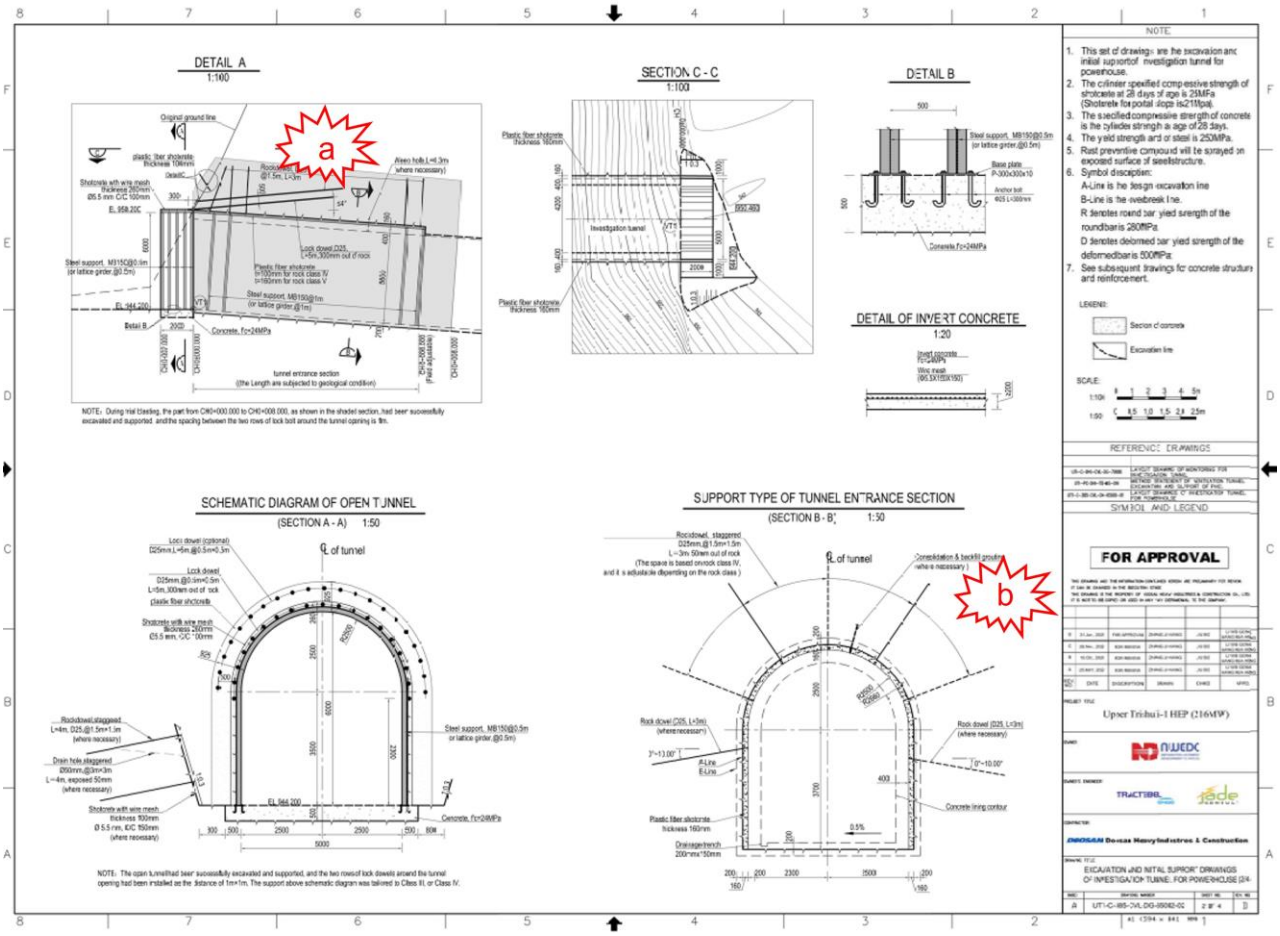
TUNNEL SUPPORT PATTERN

Rock mass quality		40≥Q	10≥Q>40	4≥Q>10	1≥Q>4	Q<1
Q value of rock mass quality for calculation		40	25	7	2.5	0.5
Support type		I	II	III	IV	V
Inner dimension(m)		Wid=2.2m, H=5.8m				
Excavation Parameter						
ESR		1.3	1.3	1.3	1.3	1.3
Excavation span(m)		3	3	2	1.5	0.5~1
Calculated MUS*(m)		11	9	5	3	1
MUS* for shotcrete application(m)			9	2	1.5	1
MUS* for rock dowel installation(m)			6	4	3.0	0.5~1
MUS* for steel support installation(m)						0.5~1
Excavation method		Blasting			Blasting/mechanically	Mechanically
Initial support parameters						
Weep hole, Φ60mm,L=0.3m		where necessary				
Max. buried depth, H		H≤305	H≤305	200<H≤305	H≤200	150<H≤200	100<H≤150	50<H≤100	H≤55	
Plastic fiber shotcrete,f'c=25MPa		Spot	T=50mm	T=160mm	T=100mm	T=160mm		T=100mm	T=60mm	
Rock dowel, D25,L=3m,alternately		Spot	@2.5m ×2.5m（roof） Spot in tunnel wall	@2m×2m	@2m×2m	@1m×1m		@1.5m×1.5m	@1.5m×1.5m	
Steel support, MB150 (or lattice girder)					@1m					
Forepoling grouted dowel,D25mm, @400mm, L=6m					where necessary					

*MUS: Maximum Unsupported Span,

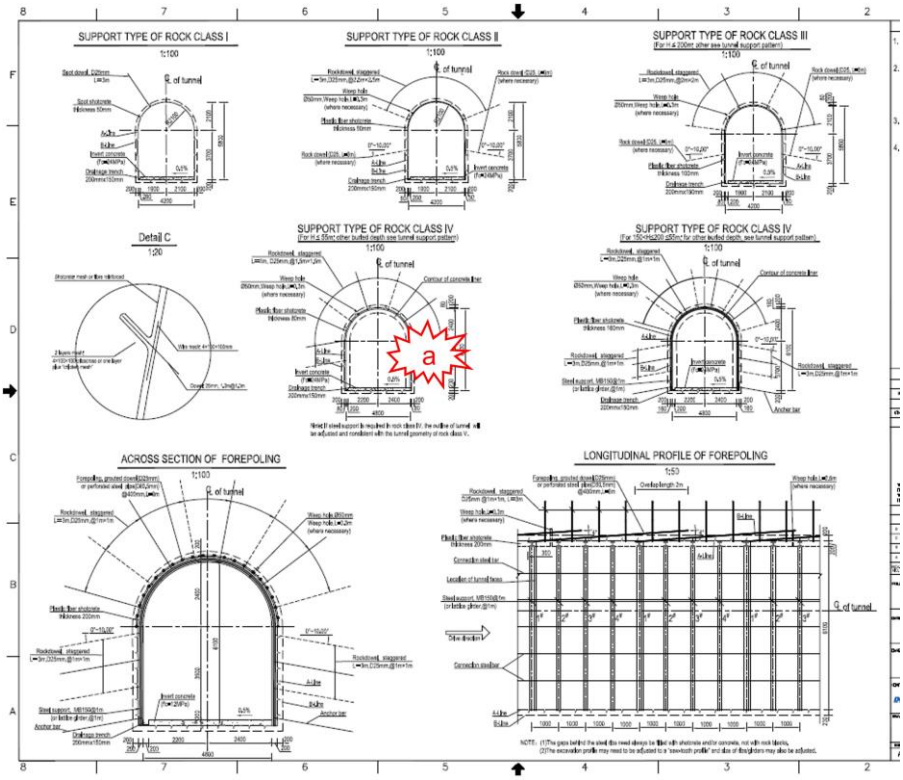
a) Support should not be specified according to overburden thickness. Delete this row.
b) There should be one thickness of shotcrete in Class IV. Use 120 mm, C25.
c) Specify clearly the support for Class V. Shotcrete thickness 160 mm, C25.

Drawing UT1-C-385-CVL-DG-65002-02, Rev. D



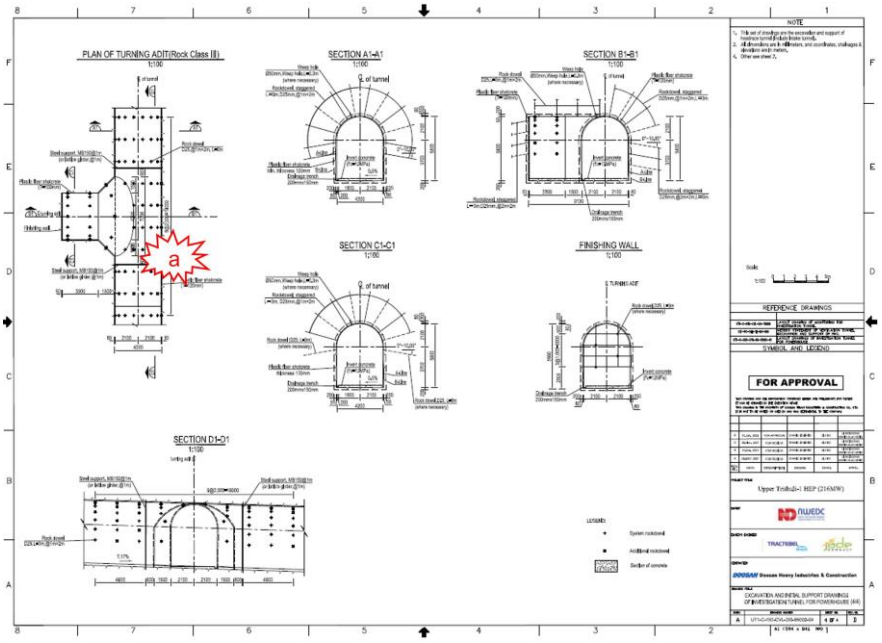
a) Angle between tunnel axis and dowels is 4°, not between horizontal and dowels.
b) **Add** to the sentence “This drawing… …in the execution stage, **with written approval of the OE**.” This refers, of course, to all other drawings in this series.

Drawing UT1-C-385-CVL-DG-65002-03, Rev. D


SUPPORT TYPE OF ROCK CLASS I
SUPPORT TYPE OF ROCK CLASS II
SUPPORT TYPE OF ROCK CLASS III
Detail C
SUPPORT TYPE OF ROCK CLASS IV
SUPPORT TYPE OF ROCK CLASS IV
a
ACROSS SECTION OF FOREPOLING
LONGITUDINAL PROFILE OF FOREPOLING

a) Do not connect the support type with overburden thickness. Use one thickness in Class IV (120 mm, C25).

Drawing UT1-C-385-CVL-DG-65002-04, Rev. D



a) Clearly indicate in which area the shotcrete thickness in the junction is 120 mm in Class III.

Dr. Ulrich Glawe

(Signature)